APPENDIX 1

```
Cambridge Instruments QUANTIMET 970QUIPS/MX:  V08.00
      USER:
ROUTINE : CONWID

      NAME      =     CONWID
      DOES =    % AREA. CONVOLUTED WIDTH. & ANISOTROPY
HISTOGRAMS
      AUTH =    B. KRESSNER
      DATE =    17 FEB 85
      DATE =    18 MAY 2000.  RECENT ADAPTATION OF MBPAS3
      COND =    Cambridge MACROVIEWER:  50 mm EL-NIKOR Lens:
NO extension tubes:  4 100-watt floods; f/8; scanner pole posn 43cm;
                  Plate (1/4 in.) glass over 4x5 Polaroid Photos

      Enter specimen identity
      Scanner     (No. 2 Chalnicon LV = 0.00 SENS= 2.33 PAUSE )
      Load Shading Corrector ( pattern -MBLOWN)
      Calibrate User Specified (Cal Value = 2.962 microns      per pixel)

      SUBRTN STANDARD
      TOTANISOT :=    0.
      TOTFIELDS :=    0.
      PERCAREA  :=    0.
      TOTPERCAR:=     0.
      STAGEX          : =    10000.
      STAGEY          :=     10000.

      For MONTAGE     =      1 to 2

      Stage Move (STAGEX, STAGEY)
      Stage Scan          (      X       Y)
            scan origin   STAGEX          STAGEY
            field size          85500.0          56667.0
            no of fields  3           4     )

      Scanner     (No. 2 Chalnicon LV=0.00 SENS = 2.33 PAUSE )

      For FIELD

      Scanner     (No. 2 Chalnicon AUTO-SENSITIVITY LV= 0.00 )
      Image Frame is Rectangle ( X: 48, Y: 36, W: 800, H: 622, )
      Live Frame is Standard Live Frame
      Detect 2D   (Darker than 32. Delin)
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        Amend(OPEN by   1)
        Psuedo-Colour Setup - Load Binary A of LUT GREY
              with colour (R  0,G  0,B   0)
        Measure field - Parameters into array FIELD
5       ANISOT      := FIELD ANISOTROPY
        ANISOT      := 1./ ANISOT
        Distribute COUNT vs ANISOT (Units  UNITS     )
              into ANISOT from 0.00 to    1.50 into 15 bins, differential
        TOTANISOT :=     TOTANISOT + ANISOT
10      TOTFIELDS :=     TOTFIELDS + 1.
        PERCAREA  :=     100. * FIELD AREAFRACT
        TOTPERCAR:=      TOTPECAR + PERCAREA

        Distribute COUNT vs PERCAREA (Units % AREA     )
15            into GRAPH1 from 0.00 to 90.00 into 15 bins. differential

        Live Frame is Standard Live Frame
        Measure feature       AREA PERIMETER LENGTH ROUNDNESS
              into array FEATURE1 (     of 750 features and    7 parameters)
20
        FEATURE1 CALC := ((4. *AREA/PI)^0.50000)
        FEATURE1   CALC.C      := 0.9000 * (  (  4. * AREA /
  PERIMETER ) * ( 1. / ROUNDNESS) ^0.25000 )

25      FEATURE1 CALC.C        :=  CALC.C /       CAL.CONST
        Accept FEATURE1 CALC.C from         3. to          1000.
        FEATURE1 CALC.C        :=  CALC.C * CAL.CONST

        Distribution of COUNT (Units COUNT          ) v CALC.C (Units
30  MICRONS    )
              from FEATURE1 in HISTO1 from 1.000 to 1000.
              in 15 bins (LOG)

        Distribution of AREA (Units SQ MICRONS) v CALC.C (Units
35  MICRONS    )
              from FEATURE1 in HIST04 from 1.000 to 1000.
              in 15 bins (LOG)

        FEATURE1 CALC   :=      CALC / CAL.CONST
40      Accept FEATURE1 CALC from     3.  to 1000.
        FEATURES1 CALC :=       CALC * CAL.CONST

        Distribution of COUNT (Units COUNT      ) v CALC (Units
  MICRONS    )
45            from FEATURE1 in HIST03 from 1.000 to 1000.
```

```
                in 15 bins (LOG)

          Stage Step

 5        Next FIELD

          Pause Message
          PLEASE POSITION THE SECOND SET OF PHOTOS
          Pause
10
          Next

          Print " "
          Print Distribution (  GRAPH1, differential, bar chart, scale = 0.00)
15        Print "FIELD COUNT vs PERCENT AREA HISTOGRAM"
          Print " "
          Print "AVE % AREA = " , TOTPERCAR / TOTFIELDS
          Print " "
          Print " "
20        Print Distribution ( HIST01, differential, bar chart, scale = 0.00 )
          Print "PORE COUNT VS CON WIDTH (um)"
          For LOOPCOUNT = 1 to 15
          Print " "
          Next
25        Pause
          Print Distribution (  HIST04, differential, bar chart, scale = 0.00 )
          Print "CUM PORE A% VS CON WIDTH (um)"
          Print " "
          Print " "
30        Print Distribution (  ANISOT, differential, bar chart, scale = 0.00 )
          Print "# OF FIELDS vs ANISOTROPY"
          Print " "
          Print " "
          Print "AVERAGE PORE ANISOTROPY (TAN THETA) = " ,
35   TOTANISOT / TOTFIELDS
          Print " "
          Print "TOTAL SCANNED AREA = " , CL, FRAREA * FIELDNUM
     / ( 1. * 10. ^8.). "   SQ CM"
          For LOOPCOUNT = 1 to 8
40        Print " "
          Next
          END OF PROGRAM
```

APPENDIX 2

```
     Cambridge Instruments  QUANTIMET 970QUIPS/MX:   V08.02 USER:
     ROUTINE: FUZZIO
 5
     NAME =     FUZZB
     DOES =     PR/EL ON TISSUES; GETS HISTOGRAM
     AUTH =     B.E. KRESSNER
     DATE =     10 DEC 97
10   COND =     MACROVIEWER; DCI 12X12; FOLLIES PINK
                FILTER; 3X3 MASK 60 MM MICRO-NIKKO,F/4; 20
                MM EXTENSION TUBES; 2 PLATE (GLASS)
                FIXTURE MICRO-NIKKOR AT FULL EXTENSION
                FOR MAX MAG!!!!
15              ROTATE CAM 90 deg SO THAT IMAGE ON RIGHT
                SIDE!!
                ALLOWS TYPICAL PHOTO


     Enter specimen identity
20   Scanner        (No. 1 Chalnicon LV= 0.00 SENS= 2.36 PAUSE)
     Load Shading Corrector( pattern - FUZZ7 )
     Calibrate User Specified (Cal Value - 9.709 microns        per pixel)

     SUBRTIN STANDARD
25
     TOTPREL    :=     0.
     TOTFIELDS  :=     0.
     PHOTO      :=     0.
     MEAN       :=     0.
30
     If PHOTO = 1. then
     Pause Message
     WANT TYPICAL PHOTO (1 YES; 0 NO)?
     Input PHOTO
35   Endif

     If PHOTO = 1. then
     Pause Message
     INPUT MEAN VALUE FOR PR/EL
40   Input MEAN
     Endif

     For SAMPLE =       1 to     2

45   If SAMPLE = 1. then
```

```
STAGEX      := 36000.
STAGEY      := 144000.
Stage Move (STAGEX,STAGEY)
Pause Message
please position fixture

Pause
STAGEX      := 120000.
STAGEY      := 144000.
Stage Move (STAGEX,STAGEY)
Pause Message
please focus
Detect 2D      (Darker than 54, Delin PAUSE)
STAGEX      :=  36000.
STAGEY      :=  144000.
Endif
If SAMPLE = 2. then
STAGEX      := 120000.
STAGEY      := 44000.
Stage Move (STAGEX,STAGEY)
Pause Message
please focus
Detect 2D      ( Darker than 54, Delin)
STAGEX      :=  36000.
STAGEY      :=  44000.
Endif
StageMove ( STAGEX,STAGEY)
Stage Scan (          X       Y
            scan origin  STAGEX  STAGEY
            field size    6410.0    78000.0
            no of fields   30          1   )

For FIELD
If TOTFIELDS = 30. then
Scanner   (No. 1 Chalnicon AUTO-SENSITIVITY LV=0.01)
Endif
Live Frame is Standard Image Frame
Image Frame is Rectangle( X: 26, Y: 37, W: 823, H: 627,  )

Scanner        (No. 1 Chalnicon AUTO-SENSITIVITY LV= 0.01  )
Image Frame is Rectangle ( X: 48, Y: 37, W: 803, H: 627, )
Detect 2D      ( Darker than 54, Delin )
Amend( OPEN by 0 )
Measure field - Parameters into array FIELD
BEFORPERI := FIELD PERIMETER
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```
     Amend( OPEN by 10)
     Measure field - Parameters into array FIELD
     AFTPERIM:= FIELD PERIMETER
 5
     PROVEREL:= ( ( BEFORPERI – AFTPERIM ) / ( I.FRAME.H *
     CAL.CONST ) )
     TOTPREL  := TOTPREL + PROVEREL

10   TOTFIELDS:= TOTFIELDS + 1.

     If PHOTO ~ 1. then
     If PROVEREL > (0.95000 * MEAN ) then
     If PROVEREL < (1.0500 * MEAN ) then
15   Scanner (No. 1 Chalnicon AUTO-SENSITIVITY LV = 0.01 PAUSE)
     Detect 2D ( Darker than 53 and Lighter than 10, Delin PAUSE
     Endif
     Endif
     Endif
20
     Distribute COUNT vs PROVEREL (Units MM/MM      )
          into GRAPH from     0.00 to          5.00 into 20 bins, differential

     Stage Step
25   Next FIELD
     Next

     Print " "
     Print "AVE PR-OVER-EL (UM/UM)=" , TOTPREL / TOTFIELDS
30   Print " "
     Print "TOTAL NUMBER OF FIELDS =" , TOTFIELDS
     Print " "
     Print "FIELD HEIGHT (MM)=",I.FRAME.H * CAL.CONST / 1000
     Print " "
35   Print " "
     Print Distribution ( GRAPH, differential, bar chart, scale= 0.00)
     For LOOPCOUNT = 1 to 26
     Print " "
     Next
40   END OF PROGRAM
```

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